Strategy in the Case of a Wrecked Papyrus: Is an Intervention Appropriate?

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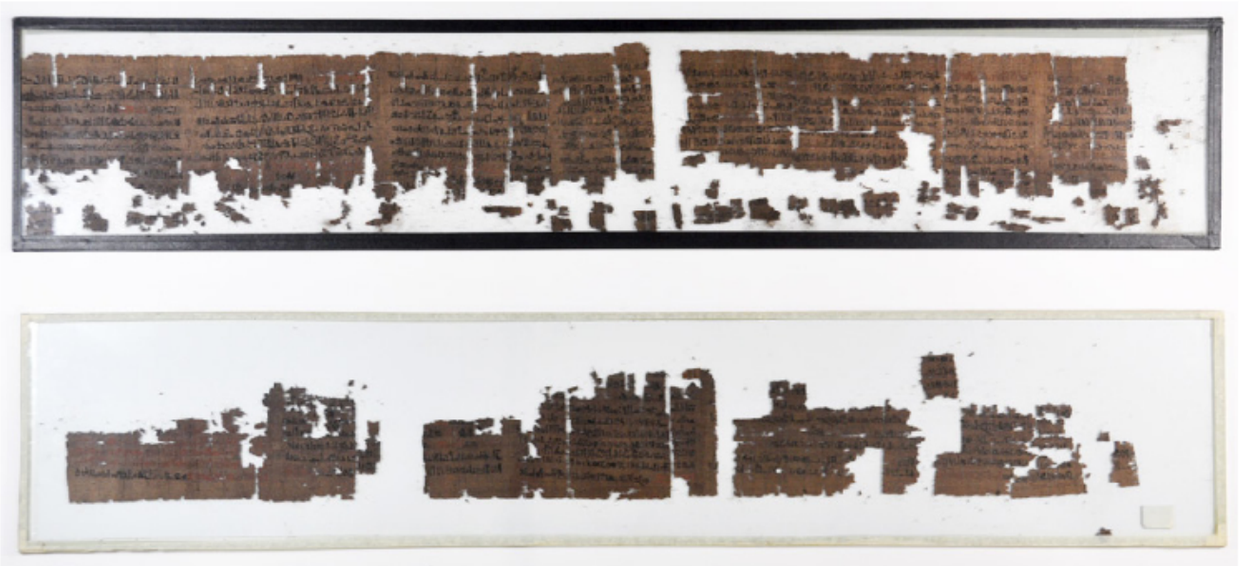

Fig. 1: Overall view of mounts 1 and 7 (Menei & Caylux©).

Some works may be historically significant but in disastrous condition. At each stage of evaluation of the artifact, the conservator finds himself or herself confronted with the very question of whether to intervene.

In 2010, the Department of Egyptian Antiquities of the Louvre asked us to undertake research on the physical condition and possibilities for intervention on a large (estimated length of the scroll: seven metres) and exceptional papyrus, recently acquired by the Museum (inv.E 32 847) (Fig. 1).

Historical background

The document inscribed recto-verso, dated to the New Kingdom of Egypt (1550-1050 BC) displays a medical treaty on each side. The recto bears descriptions of diseases together with remedies to treat them, for which some parallels are known from other papyri. The verso shows longer and more numerous descriptions together with magical spells unknown from other documents. The first text was written during the reigns of Thutmose III or Amenhotep II (1479-1404 BC) and the second one 150 years later at the beginning of the Ramesside period as an updated version of the preceding text. The manuscript is written in hieratic script, with cursive hieroglyphs, in carbon black ink and some sections are inscribed in red ink. The papyrus was acquired in 1953 by a private individual. It has remained the property of various private owners until its purchase in 2007 by the Department of Egyptian Antiquities of the Louvre thanks to the contribution of the Ipsen Group. Its general condition was however so preoccupying that the Museum hesitated in concluding its purchase which was finally justified by the scientific importance of the document.

The production of papyri

The oldest known papyrus is an unwritten scroll found in a tomb and dated to 3100 BC.
It shows evidence of a perfectly developed production process.

A sheet of papyrus is made from strips cut vertically from the stem of the Cyperus papyrus; two layers of strips would be laid down one upon the other at right angles and then pressed. Like all organic materials, papyri eventually suffer deterioration through ageing, but stored under good conditions, they can still be very light in

Fig. 2: Detail: dust, white halo and piece displaced

Fig. 3: Detail: crumbly fragment and adhesive tape

colour, comparatively flexible, with a good consistency of fibres, even after 5000 years.

Present condition

The dark brown colour and the fragile and crumbly material of the document are indicative of an unusual and advanced state of deterioration. The scroll was probably in bad condition when it was discovered.

It is separated into two parts (top and bottom) by a horizontal fracture running over its entire length. When the papyrus was unrolled, fragments were placed into nine mounts without the corresponding top and bottom parts being joined. Fragments were attached with strips of self-adhesive plastic tape between two sheets of glass bound with opaque self-adhesive tape. The glass of the mounts is very soiled by the dust of papyrus and some of them show white stains due to previous exposure to water. The papyrus comprises many vertical fractures, lacunae and broken fragments, many of them being detached and now loose. White haloes are today the only traces of pieces either displaced or lost (Fig. 2). Some fragments have become so crumbly that it is no longer possible to distinguish the fibre structure of the papyrus (Fig. 3).

Intervention

After a preliminary thorough assessment of the condition and the constituents of the document, sponsors were sought to support research into the practical feasibility of a repair intervention. Once this research is completed, will it be possible to open the mounts, handle the fragments and replace them in the right order and store them in a satisfactory way?

A very progressive approach was decided consisting of several steps (0 to 5, steps 0 to 4 being completed) in order to evaluate the practical possibilities.

Step 0

Initially, an overall H-D photographic study was carried out to document all pieces, recto and verso. This then makes it possible for an epigraphist to work simultaneously on the texts with the competent curator in order to find the former position of the fragments misplaced.

We adopted the principle of a chronological journal in order to record every single operation (meetings, tests, orders, conversations, recommendations).

We also got in touch with colleagues specialized in the conservation of papyri and exchanged our views on our problem: Bridget Leach from the British Museum in London and Florence Dalbre from the Bodmer Foundation in Geneva. These contacts have been very valuable to compare the conservation materials used as well as to help us choose the methods to be applied.

Step 1

Opening the mounts

After this preliminary evaluation, we were conscious of the extreme fragility of the document and our first intention was to limit our intervention to a maximum by only replacing the fragments and changing the glass of the mounts. We began by opening a first mount but we quickly noticed that despite all our precautions, the papyrus was too brittle to be lifted out and handled

without preliminary consolidation.

Our next objective was to select an appropriate consolidant (by nature irreversible) to restore the consistency of the material.

Step 2
Consolidant

On the basis of our practical experience in the conservation of papyri (Menei 2010) and that of our foreign colleagues (Darbre 2008), it was agreed to select funori (an adhesive paste made from Japanese seaweeds of the Gloïopeltis family). This is well known for its great smoothness. Its low surface tension allows for better penetration inside the layers of fibres of papyri which are not refined and not felted like paper. Used well, it does not cause brightness nor darkening of the papyrus.

Several methods for preparing funori exist in Japan: it can be soaked for varying durations, heated or unheated and can be used in various concentrations. To reduce the surface tension, we thought to add a few drops of ethanol. Then a method of preparation and concentrations meeting our requirements of penetration inside our brittle papyrus had to be chosen. We carried out a number of tests to determine the best preparation and concentration of funori.

Two types of funori can be found on the market: an artisanal product sold as dried seaweeds and a product resulting from laboratory extraction (JunFunori®) sold as a white powder. We are currently hesitating between these two products: the first one benefits from already being tried and tested and the second from a laboratory production guarantee although it may be of variable quality. We must carry out quality tests after maturing of the later product (Dauchez 2012, Michel 2011). For the moment we have decided to use traditional Japanese funori sold as dried seaweeds.

Based on our experience and on conservation literature, the safest method for applying funori consists in brushing it over the surface through an intermediary film. The surface is too fragile to support direct friction of the brush and vaporization does not permit overseeing easily the funori impregnation uniformly. After a test, it appeared absolutely indispensable to supplement consolidation by adding a lining paper.

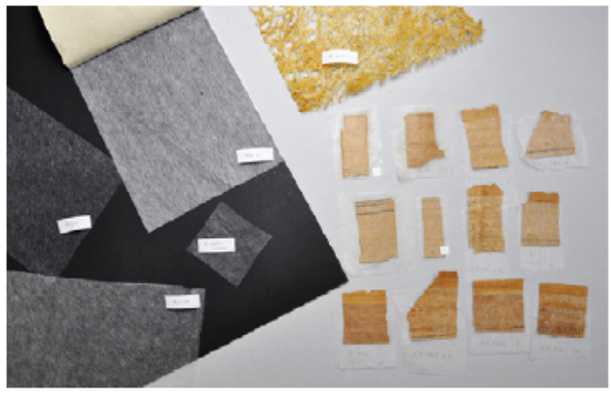

Fig. 4: Products samples and tests. Photos © Menei & Caylux

Step 3
Facing

Our selection criteria for the lining paper were a great transparency so that the written side being covered should remain readable, a good solidity and a good penetrating ability to allow the transfer of consolidant.

A number of the thinnest Japanese papers were tested:

Paper Nao ref RK 00 3,5g/m²
Paper Nao ref RK 01 8g/m²
Berlin tissue 2g/m²
Tengu 3,5g/m² and 2g/m²

The first mentioned paper, although very thin, is so coated that it does not let the consolidant get through easily. Best results are obtained with 2g/m² papers.

Objective	Final choice
Determine the best method of preparation: various durations for soaking and heating	24 hours soaking + 15 minutes heating
Define the concentration-ratio dry seaweed / water: 0,25%, 0,50%,1%	0,50%
Assess the effect of adding ethanol	None (water penetrates more rapidly, but the long molecules of consolidant remain on the surface)

Scope of our tests:

Objective	Final choice
Assess the number of layers of consolidant necessary	Two layers
Appraise the quantity of consolidant on the brush	The brush should be very lightly impregnated in order to avoid overflowing on the sides and wetting the papyrus too much
Determine if pre-pasting the paper increases transparency	Not necessary with two layers of consolidant
Evaluate the need for pre-humidification of the papyrus	Essential to facilitate penetration

Step 4

Consolidation/ facing protocol

The putting into place of this procedure has a big influence on all parameters (dispersion, transparency, brightness, pasting quality).

We carried out tests on pieces of paper toned brown using watercolour paint and on pieces of unwritten papyri provided by the Department (Fig. 4).

As for the method of application, we chose to lay the consolidant over the surface through Japanese paper with a flexible flat brush. It appears to us to be the fastest and the most precise method.

Ongoing step

At this stage, our reflection and the preparation of the protocol must be confronted with the current condition of the document. We must now carry out our first tests on small original fragments. With the assistance of the curator, we will select them and choose the side to be covered with the facing.

After opening the mounts, the strips of adhesive bands will be cut right on the edge of the fragments. Considering the extreme state of brittleness of the papyrus, it is impossible at the present time to eliminate them. After consolidation and lining, we hope that it will be possible. This is why, we would be more favourable to lining the side without adhesive bands.

We are also developing a method for removing fragments from their mount using a sandwich of nonwoven fabric with the aim of implementing the protocol for each separate fragment.

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